

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PU040061	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US2004/006807	International filing date (day/month/year) 08.03.2004	Priority date (day/month/year) 08.03.2004	
International Patent Classification (IPC) or national classification and IPC H04L27/00			
Applicant THOMSON LICENSING S.A.et al.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>(sent to the applicant and to the International Bureau) a total of sheets, as follows:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</i></p>			
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application 			
Date of submission of the demand 23.08.2005	Date of completion of this report 22.02.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Moreno, M Telephone No. +31 70 340-4414		



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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
 2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-10 as originally filed

Claims, Numbers

1-22 as originally filed

Drawings, Sheets

1/2-2/2 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
 - The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
 - This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
 - the entire international application,
 - claims Nos. 1, 17 (part)
because:
 - the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 - the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 - the claims, or said claims Nos. 1, 17 (part) are so inadequately supported by the description that no meaningful opinion could be formed.
 - no international search report has been established for the said claims Nos.
 - the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form has not been furnished
 does not comply with the standard
 - the computer readable form has not been furnished
 does not comply with the standard
 - the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
 - See separate sheet for further details

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-22
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-22
Industrial applicability (IA)	Yes:	Claims	1-22
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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Re Item III

1. Present claims 1 and 17 relate to an extremely large number of possible methods/apparatus respectively. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the apparatus/methods claimed.
Consequently, the examination has been carried out for those parts of the claims which are supported and disclosed, namely those parts relating to the method (claim 1) and apparatus (claim 17) for generating an error signal for an automatic frequency control (AFC) loop in a CDMA system.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:
 - D1: US 2002/114405 A1 (BLACK PETER J ET AL) 22 August 2002 (2002-08-22).
 - D2: US 2003/235258 A1 (KENNEY THOMAS J ET AL) 25 December 2003 (2003-12-25).
 - D3: US 2003/128678 A1 (SENDONARIS ANDREW ET AL) 10 July 2003 (2003-07-10).
 - D4: US-B-6 493 4061 (OAKLEY JOHN RICHARD ET AL) 10 December 2002 (2002-12-10).
2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-22 does not involve an inventive step in the sense of Article 33(3) PCT.
- 2.1. The document D1 is regarded as being the closest prior art to the subject-matter of independent 1 claim, and discloses (the references in parentheses applying to this document):
A method for generating an error signal for an automatic frequency control (AFC) loop in a CDMA system (page 1, column 1, paragraph 3; page 1 column 2, paragraph

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14); said method comprises the steps of accumulating information relating to phase differences in received signals (page 2, column 2, paragraph 27 states that the pilot signal is recovered, the output of the multiplier 126 of Fig. 1 is then the recovered pilot signal. According to page 3, paragraph 50, "the FLL then determines the phase error present in the signal". It is regarded that said signal is the recovered pilot. The error that is determined is the phase increment "y" that is input to a modulo 256 accumulator and updated at 64-chip rate. Said phase increment, as stated in paragraph 37, represents the phase shift of the signal over a sub-segment. Therefore, this is considered as describing an accumulation of information relating to phases differences in received signals).

comparing the accumulated information against predetermined threshold levels and generating the error signal when at least one of predetermined threshold levels is satisfied (from page 3, column 2, last paragraph to page 4, column 1, first paragraph. According to this passage, the predetermined threshold is 45. If the accumulated error has reached said predetermined threshold, the rotation is performed. It is regarded that this implies that the error signal is generated to indicate to the rotator (110) that a rotation is needed when a predetermined threshold level is satisfied).

The subject-matter of claim 1 therefore differs from this known method in that: while in D1 the magnitude of phase differences is accumulated, in the present claim 1, the sign of the phase differences is accumulated.

The problem to be solved by the present invention is regarded as how to provide a more robust and stable AFC loop.

Document D2 discloses the use of a sign detector block that operates on the pilot channel (document D2, page 2, paragraph 21, lines 17-19) in order to remove the amplitude/magnitude dependency of the signal input to the loop filter, thereby providing a more robust loop (document D2, page 3, paragraph 32).

Therefore, it would be obvious to the skilled person in the art, namely when the same result is to be achieved, to apply a sign detector block to the signal generated in step 210 of document D1, according to the teachings of document D2, thereby arriving at

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a method according to claim 1 and solving the problem posed without implying an inventive step in so doing.

The present independent claim 1 cannot be considered as involving an inventive step (Article 33(3) PCT).

- 2.2. Independent claim 17 implies a slight constructional change in the corresponding apparatus of claim 1, where the thresholds are claimed to be adaptive. This feature comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Similar reasoning to that of point 2.1 regarding the lack of inventive step applies to claim 17 which therefore also lacks inventive step.
- 2.3. The feature of decimating the accumulated sign information is disclosed in D1 (see claim 7). Similar reasoning to that of point 2.1 applies here. Consequently, independent claims 12 and 20 also lack inventive step.
3. Dependent claims 2-11, 13-16, 18, 19, 21 and 22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons are the following:
 - 3.1. The subject-matter of dependent claims 2, 3, 11, 13, 15, 16, 21 and 22 is present in D1 (see Fig. 1 and Fig. 2).
 - 3.2. Additional features claimed in dependent claims 4, 8, 9, 10 and 14 are described in document D3 as providing the same advantages as the present application. The skilled person would therefore regard it as normal design option to include these features in the AFC loop.
 - 3.3. Dependent claims 5, 6, 7, 18 and 19 do not contain any additional subject-matter which contributes to add an inventive step, in combination with the features of any claim to which they refer since the additional subject-matter of those claims comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen (see D4 for

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illustrative purposes).